

**WHAT IS CLAIMED IS**

1. A method for managing resources provided by services in a distributed computing  
5 environment, comprising:

receiving from a client a service request message in a data representation language  
referencing a resource provided by a service, wherein said service request  
message specifies a first requested lease period;

10

granting access to said referenced resource for a first granted lease period; and

sending a service request response message in said data representation language  
advising said client of said first granted lease period.

15

2. The method as recited in claim 1, wherein said receiving, said granting, and said  
sending are performed by said service.

3. The method as recited in claim 1,

20

wherein said receiving a service request message and said sending a service  
request response message are performed by a space service, wherein said  
space service comprises a plurality of service advertisements for enabling  
access by clients to resources provided by a plurality of services including  
said service; and

25

wherein said space service obtains said first granted lease period from said service  
on behalf of said client.

- 30 4. The method as recited in claim 1,

wherein said service comprises a service process and a service message endpoint  
operatively coupled to said service process and operable to receive request  
messages from and send response messages to said client in said data  
representation language; and

wherein said receiving a service request message and said sending a service  
request response message are performed by said service message endpoint  
on behalf of said service process.

5. The method as recited in claim 1, further comprising:

receiving from said client, prior to said first granted lease period expiring, a lease  
renewal message in said data representation language referencing said  
resource provided by said service, wherein said lease renewal message  
specifies a second requested lease period;

granting access to said referenced resource for a second granted lease period; and

sending a lease renewal response message in said data representation language  
advising said client of said second granted lease period.

6. The method as recited in claim 1, further comprising:

receiving from said client a lease cancel message in said data representation  
language referencing said resource; and

terminating said first granted lease period for accessing said resource in response  
to said receiving a lease cancel message.

00530-9725960

7. The method as recited in claim 6, further comprising sending a lease cancel acknowledgment message in said data representation language advising said first granted lease period for accessing said resource is terminated.

5 8. The method as recited in claim 1, further comprising providing to said client an address for sending data representation language messages for managing leases of resources provided by said service.

9. The method as recited in claim 7, wherein said service request message is  
10 received by said service at said address provided to said client.

10. The method as recited in claim 7, wherein said address is a Uniform Resource Identifier (URI).

15 11. The method as recited in claim 1, further comprising terminating said granted access when said first granted lease period expires.

12. The method as recited in claim 1, wherein said data representation language is  
20 eXtensible Markup Language (XML).

13. The method as recited in claim 1, wherein said first granted lease period is less than or equal to said first requested lease period.

25 14. A method for accessing resources provided by services in a distributed computing environment, comprising:

a client sending a service request message in a data representation language  
referencing a resource provided by a service, wherein said service request  
30 message specifies a first requested lease period;

said client receiving a service request response message in said data representation language, wherein said service request response message includes a first granted lease period for accessing said resource.

5

15. The method as recited in claim 14, wherein said client sends said service request message to said service, and wherein said client receives said service request response message from said service.

10

16. The method as recited in claim 14,

wherein said client sends said service request message to a space service, wherein said space service comprises a plurality of service advertisements for enabling access by clients to resources provided by a plurality of services including said service;

15

wherein said space service obtains said first granted lease period from said service on behalf of said client; and

20

wherein said client receives said service request response message from said space service.

17. The method as recited in claim 14,

25

wherein said client comprises a client process and a client message endpoint operatively coupled to said client process and operable to send request messages to and receive response messages from said service in said data representation language; and

30

wherein said client sending said service request message and said client receiving

007680-9725960

said service request response message are performed by said client message endpoint on behalf of said client process.

18. The method as recited in claim 14, further comprising:

5

said client sending, prior to said first granted lease period expiring, a lease renewal message in said data representation language referencing said resource provided by said service, wherein said lease renewal message specifies a second requested lease period;

10

said client receiving a lease renewal response message in said data representation language, wherein said lease renewal response message includes a second granted lease period for accessing said resource.

15 19. The method as recited in claim 14, further comprising:

said client sending a lease cancel message in said data representation language referencing said resource, wherein said lease cancel message terminates said first granted lease period for accessing said resource; and

20

said client receiving a lease cancel acknowledgment message in said data representation language acknowledging said first granted lease period for accessing said resource is terminated.

25 20. The method as recited in claim 14, further comprising:

said client accessing a service advertisement for enabling access by clients to resources provided by said service, said service advertisement comprising:

30 a data representation language message schema comprising descriptions of

data representation language messages for managing leases of  
resources provided by said service; and

an address for said service receiving said data representation language  
5 messages for managing leases of resources provided by said  
service.

21. The method as recited in claim 20, further comprising said client generating said  
service request message in accordance with a description of said service request message  
10 comprised in said descriptions of data representation language messages for managing  
leases of resources.

22. The method as recited in claim 20, wherein said service request message is sent by  
said client to said address for said service receiving said data representation language  
15 messages.

23. The method as recited in claim 20, wherein said address is a Uniform Resource  
Identifier (URI).

20 24. The method as recited in claim 14, wherein said data representation language is  
eXtensible Markup Language (XML).

25. A method for managing resources provided for clients by services in a distributed  
25 computing environment, comprising:

granting to a client access to a resource provided by a service for a first granted  
lease period;

30 receiving, prior to said first granted lease period expiring, a lease renewal message



resource is terminated.

30. The method as recited in claim 25, wherein said granting access to said resource for said first granted lease period comprises:

5

receiving a service request message in said data representation language  
referencing said resource provided by said service, wherein said service  
request message specifies a first requested lease period;

10

sending a service request response message in said data representation language,  
wherein said service request response message includes said first granted  
lease period for accessing said resource.

31. The method as recited in claim 25, wherein said second granted lease period is  
15 less than or equal to said second requested lease period.

32. The method as recited in claim 25, wherein said data representation language is eXtensible Markup Language (XML).

20

33. A method for managing resources provided for clients by services in a distributed computing environment, comprising:

25           a first client sending a first service request message in a data representation  
          language referencing a resource provided by a service, wherein said first  
          service request message specifies a first requested lease period;

said service receiving said first service request message;



said service granting to said first client access to said referenced resource for a first granted lease period;

said service sending a service request response message in said data representation language advising said first client of said first granted lease period; and

said first client receiving said service request response message, wherein said service request response message includes said first granted lease period for accessing said resource.

34. The method as recited in claim 33, further comprising:

said first client sending, prior to said first granted lease period expiring, a lease renewal message in said data representation language referencing said resource provided by said service, wherein said lease renewal message specifies a second requested lease period;

said service receiving, prior to said first granted lease period expiring, said lease renewal message;

said service granting access to said referenced resource for a second granted lease period;

said service sending a lease renewal response message in said data representation language advising said first client of said second granted lease period; and

said first client receiving said lease renewal response message, wherein said lease renewal response message includes said second granted lease period for accessing said resource.

35. The method as recited in claim 33, further comprising:

a second client sending a second service request message in said data representation language referencing said resource provided by said service, wherein said second service request message specifies a third requested lease period;

said service receiving said second service request message;

said service granting, prior to said first granted lease period expiring, to said second client access to said referenced resource for a third granted lease period;

wherein said first granted lease period and said second granted lease period at least partially overlap.

36. The method as recited in claim 33, wherein said data representation language is eXtensible Markup Language (XML).

37. A method for managing service advertisements for accessing resources provided by services in a distributed computing environment, comprising:

a space service receiving a publish advertisement lease request message in a data representation language referencing a service advertisement for a service, wherein said publish advertisement lease request message specifies a first requested publishing lease period; and

said space service granting publishing of said service advertisement for a first granted publishing lease period;

wherein said space service comprises a plurality of service advertisements,  
wherein each service advertisement comprises information to enable  
access by clients to resources provided by a corresponding service.

5

38. The method as recited in claim 37, wherein, during said granted publishing lease period, said service advertisement of said service is accessible to clients of said space service, and wherein resources of said service are accessible to said clients of said space service by accessing said service advertisement.

10

39. The method as recited in claim 37, further comprising:

said space service sending a publish advertisement lease request response message in said data representation language advising said service of said first granted publishing lease period.

15

40. The method as recited in claim 37, further comprising:

said space service receiving, prior to said first granted publishing lease period expiring, a publish advertisement lease renewal message in said data representation language referencing said service advertisement provided by said service, wherein said publish advertisement lease response message specifies a second requested publishing lease period;

20

25           said space service granting publishing of said service advertisement for a second  
granted publishing lease period; and

said space service sending a publish advertisement lease renewal response message in said data representation language advising said service of said second granted publishing lease period.

30

41. The method as recited in claim 37, further comprising said space service marking as stale said service advertisement when said first granted lease period expires.

5 42. The method as recited in claim 41, further comprising said space service prohibiting access by clients to said stale service advertisement.

43. The method as recited in claim 41, further comprising:

10           said space service receiving a publish advertisement lease renewal message in said  
data representation language referencing said service advertisement  
provided by said service, wherein said publish advertisement lease renewal  
message specifies a second requested publishing lease period;

15           said space service granting publishing of said service advertisement for a second  
              granted publishing lease period; and

said space service removing said marking as stale of said service advertisement  
thus allowing access by clients to said service advertisement.

44. The method as recited in claim 41, further comprising removing said service advertisement from said space service subsequent to said marking said service advertisement as stale.

25 45. The method as recited in claim 44, further comprising said space service determining that said service advertisement has been marked as stale for at least a maximum allowed period for said service advertisement to remain on said space service while marked as stale, wherein said removing said service advertisement from said space service is performed in response to said determining.

46. The method as recited in claim 37, further comprising:

said space service receiving an unpublish advertisement lease message in said data representation language referencing said service advertisement; and

said space service unpublishing said service advertisement in response to said receiving an unpublish advertisement lease message.

47. The method as recited in claim 37, further comprising:

said space service receiving a space service request message in said data representation language referencing said service advertisement for said service, wherein said space service request message specifies a first requested lease period for a first client;

said space service granting to said first client access to said service advertisement for a first granted lease period; and

said space service sending a space service request response message in said data representation language advising said first client of said first granted lease period.

48. The method as recited in claim 47, further comprising said first client accessing of one or more resources of said service specified in said service advertisement, wherein said one or more resources are accessible to said first client in accordance with service resource access information comprised in said service advertisement.

49. The method as recited in claim 48, wherein said service resource access information comprises descriptions of one or more data representation language messages for accessing said resources.

50. The method as recited in claim 48, wherein said service resource access information comprises one or more Uniform Resource Identifiers (URIs) for accessing said resources.

5

51. The method as recited in claim 47, further comprising:

10 said space service receiving, prior to said first granted lease period expiring, a lease renewal message in said data representation language referencing said service advertisement, wherein said lease renewal message specifies a second requested lease period;

15 said space service granting to said first client access to said service advertisement for a second granted lease period; and

said space service sending a lease renewal response message in said data representation language advising said first client of said second granted lease period.

20 52. The method as recited in claim 47, further comprising:

25 said space service receiving a second service request message in said data representation language referencing said service advertisement for said service, wherein said second service request message specifies a third requested lease period for a second client; and

said space service granting, prior to said first granted lease period expiring, to said second client access to said service advertisement for a third granted lease period;

30

wherein said first granted lease period and said second granted lease period at least partially overlap.

53. The method as recited in claim 37, wherein said first granted publishing lease  
5 period is less than or equal to said first requested publishing lease period.

54. The method as recited in claim 37, wherein said data representation language is eXtensible Markup Language (XML).

10

55. A method for managing service advertisements for accessing resources provided by services in a distributed computing environment, comprising:

15 a space service publishing a service advertisement for a service for a first granted publishing lease period;

wherein said space service comprises a plurality of service advertisements,  
wherein each service advertisement comprises information to enable  
access by clients to resources provided by a corresponding service;

20

wherein, during said granted publishing lease period, said service advertisement of said service is accessible to clients of said service; and

25           said space service marking as stale said service advertisement when said first  
              granted lease period expires, wherein said space service prohibits access  
              by clients to said service advertisement marked as stale.

56. The method as recited in claim 55, further comprising:

30 said space service receiving a publish advertisement lease renewal message in said

data representation language referencing said service advertisement provided by said service, wherein said publish advertisement lease renewal message specifies a second requested publishing lease period;

5           said space service granting publishing of said service advertisement for a second granted publishing lease period; and

          said space service removing said marking as stale of said service advertisement thus allowing access by clients to said service advertisement.

10

57.    The method as recited in claim 55, further comprising removing said service advertisement from said space service subsequent to said marking said service advertisement as stale.

15    58.   The method as recited in claim 57, further comprising said space service determining that said service advertisement has been marked as stale for at least a maximum allowed period for said service advertisement to remain on said space service while marked as stale, wherein said removing said service advertisement from said space service is performed in response to said determining.

20

59.    A distributed computing system, comprising:

          a client device; and

25

          a service device comprising a service process executable within said service device, wherein the service device is configured to:

          receive from said client device a service request message in a data representation language referencing a resource provided by said

30





wherein said service device further comprises a service message endpoint  
operatively coupled to said service process and operable to receive request  
messages from and send response messages to said client device in said  
data representation language; and

wherein said receiving a service request message and said sending a service  
request response message are performed by said service message endpoint  
on behalf of said service process.

63. The system as recited in claim 59, wherein the service device is further configured  
to:

receive from said client device, prior to said first granted lease period expiring, a  
lease renewal message in said data representation language referencing  
said resource provided by said service process, wherein said lease renewal  
message specifies a second requested lease period;

grant access to said referenced resource for a second granted lease period; and

send a lease renewal response message in said data representation language  
advising said client device of said second granted lease period.

64. The system as recited in claim 59, wherein the service device is further configured  
to:

receive from said client device a lease cancel message in said data representation  
language referencing said resource; and

terminate said first granted lease period for accessing said resource in response to said receiving a lease cancel message.

65. The system as recited in claim 59,

wherein the service device further comprises a Uniform Resource Identifier (URI) for sending data representation language messages for managing leases of resources provided by said service process;

wherein the service device is further configured to provide said URI to said client device; and

wherein said service request message is received by said service process at said  
URI.

66. The system as recited in claim 59, wherein said data representation language is eXtensible Markup Language (XML).

67. A distributed computing system, comprising:

a client device; and

a service device, wherein the service device is configured to:

grant to said client device access to a resource provided by said service device for a first granted lease period;

receive, prior to said first granted lease period expiring, a lease renewal message in a data representation language referencing said resource



71. The system as recited in claim 67, wherein, in said granting access to said resource for said first granted lease period, the service device is further configured to:

5 receive a service request message in said data representation language referencing said resource provided by said service device, wherein said service request message specifies a first requested lease period; and

10 send a service request response message in said data representation language, wherein said service request response message includes said first granted lease period for accessing said resource.

72. The system as recited in claim 67, wherein said data representation language is eXtensible Markup Language (XML).

15

73. A distributed computing system, comprising:

20

a service device configured to provide resources to clients;

25

a space service device configured to store one or more service advertisements, wherein each service advertisement comprises information to enable access by clients to resources provided by a corresponding service device, and wherein the space service device comprises a service advertisement corresponding to said service device; and

wherein said space service device is configured to:

30

receive a publish advertisement lease request message in a data representation language referencing said service advertisement

corresponding to said service device, wherein said publish advertisement lease request message specifies a first requested publishing lease period; and

5 grant publishing of said service advertisement for a first granted publishing lease period;

wherein, during said granted publishing lease period, said service advertisement of said service device is accessible to clients of said space service device, and wherein resources of said service device are accessible to said clients of said space service device by accessing said service advertisement.

74. The system as recited in claim 73, wherein said space service device is further configured to send a publish advertisement lease request response message in said data representation language advising said service device of said first granted publishing lease period.

75. The system as recited in claim 73, wherein said space service device is further configured to:

20 receive, prior to said first granted publishing lease period expiring, a publish advertisement lease renewal message in said data representation language referencing said service advertisement provided by said service device, wherein said publish advertisement lease response message specifies a second requested publishing lease period;

25 grant publishing of said service advertisement for a second granted publishing lease period; and

send a publish advertisement lease renewal response message in said data representation language advising said service device of said second granted publishing lease period.

5 76. The system as recited in claim 73, wherein said space service device is further configured to:

mark as stale said service advertisement when said first granted lease period expires; and

10

prohibit access by clients to said stale service advertisement.

77. The system as recited in claim 76, wherein said space service device is further configured to:

15

receive a publish advertisement lease renewal message in said data representation language referencing said service advertisement provided by said service device, wherein said publish advertisement lease renewal message specifies a second requested publishing lease period;

20

grant publishing of said service advertisement for a second granted publishing lease period; and

25

remove said marking as stale of said service advertisement thus allowing access by clients to said service advertisement.

78. The system as recited in claim 76, wherein said space service device is further configured to:

30

determine that said service advertisement has been marked as stale for at least a

maximum allowed period for said service advertisement to remain on said space service device while marked as stale; and

remove said service advertisement from said space service device in response to said determining.

79. The system as recited in claim 73, wherein said space service device is further configured to:

receive an unpublish advertisement lease message in said data representation language referencing said service advertisement; and

unpublish said service advertisement in response to said receiving an unpublish advertisement lease message.

80. The system as recited in claim 73, further comprising:

a first client device; and

wherein said space service device is further configured to:

receive a space service request message in said data representation language referencing said service advertisement corresponding to said service device, wherein said space service request message specifies a first requested lease period for said first client device;

grant to said first client device access to said service advertisement for a first granted lease period; and



send a space service request response message in said data representation language advising said first client device of said first granted lease period.

5 81. The system as recited in claim 80, wherein said first client device is configured to access one or more resources of said service device specified in said service advertisement, wherein said one or more resources are accessible to said first client device in accordance with service resource access information comprised in said service advertisement, wherein said service resource access information comprises:

10

descriptions of one or more data representation language messages for accessing said resources; and

15

one or more Uniform Resource Identifiers (URIs) for accessing said resources of said service device.

82. The system as recited in claim 80, wherein the space service device is further configured to:

20

receive, prior to said first granted lease period expiring, a lease renewal message in said data representation language referencing said service advertisement, wherein said lease renewal message specifies a second requested lease period;

25

grant to said first client device access to said service advertisement for a second granted lease period; and

send a lease renewal response message in said data representation language advising said first client device of said second granted lease period.

30

83. The system as recited in claim 80, further comprising:

a second client device; and

5 wherein the space service device is further configured to:

receive a second service request message in said data representation  
language referencing said service advertisement for said service  
device, wherein said second service request message specifies a  
10 third requested lease period for said second client device; and

grant, prior to said first granted lease period expiring, to said second client  
device access to said service advertisement for a third granted lease  
period;

15 wherein said first granted lease period and said second granted lease period at  
least partially overlap.

84. The system as recited in claim 73, wherein said data representation language is  
20 eXtensible Markup Language (XML).

85. A distributed computing system, comprising:

25 a service device configured to provide resources to clients;

a space service device configured to store one or more service advertisements,  
wherein each service advertisement comprises information to enable  
access by clients to resources provided by a corresponding service device,  
30 and wherein the space service device comprises a service advertisement



88. A carrier medium comprising program instructions, wherein the program instructions are computer-executable to implement:

5

receiving from a client a service request message in a data representation language  
referencing a resource provided by a service, wherein said service request  
message specifies a first requested lease period;

10 granting access to said referenced resource for a first granted lease period; and

advising said client of said first granted lease period.

15 89. The carrier medium as recited in claim 88, wherein the program instructions are further computer-executable to implement:

receiving from said client, prior to said first granted lease period expiring, a lease renewal message in said data representation language referencing said resource provided by said service, wherein said lease renewal message specifies a second requested lease period; and

granting access to said referenced resource for a second granted lease period.

25 90. The carrier medium as recited in claim 88, wherein the program instructions are further computer-executable to implement:

receiving from said client a lease cancel message in said data representation language referencing said resource; and

30

terminating said first granted lease period for accessing said resource in response to said receiving a lease cancel message.

91. The carrier medium as recited in claim 88, wherein said data representation language is eXtensible Markup Language (XML).

92. A carrier medium comprising program instructions, wherein the program instructions are computer-executable to implement:

10

granting to a client access to a resource provided by a service for a first granted lease period;

15

receiving, prior to said first granted lease period expiring, a lease renewal message in a data representation language referencing said resource provided by said service, wherein said lease renewal message specifies a second requested lease period; and

20

granting access to said referenced resource for a second granted lease period.

93. The carrier medium as recited in claim 92, wherein the program instructions are further computer-executable to implement sending a lease renewal response message in said data representation language advising said client of said second granted lease period.

94. The carrier medium as recited in claim 92, wherein the program instructions are further computer-executable to implement:

30

receiving a lease cancel message in said data representation language referencing said resource; and

terminating said second granted lease period for accessing said resource in response to said receiving a lease cancel message; and

sending a lease cancel acknowledgment message in said data representation language advising said second granted lease period for accessing said resource is terminated.

95. The carrier medium as recited in claim 92, wherein, in said granting access to said resource for said first granted lease period, the program instructions are further computer-executable to implement:

receiving a service request message in said data representation language referencing said resource provided by said service, wherein said service request message specifies a first requested lease period; and

sending a service request response message in said data representation language, wherein said service request response message includes said first granted lease period for accessing said resource.

96. A carrier medium comprising program instructions, wherein the program instructions are computer-executable to implement:

a space service receiving a publish advertisement lease request message in a data representation language referencing a service advertisement for a service, wherein said publish advertisement lease request message specifies a first requested publishing lease period; and

said space service granting publishing of said service advertisement for a first granted publishing lease period;



99. The carrier medium as recited in claim 96, wherein the program instructions are further computer-executable to implement:

5           said space service receiving an unpublish advertisement lease message in said data representation language referencing said service advertisement; and

          said space service unpublishing said service advertisement in response to said receiving an unpublish advertisement lease message.

10   100. The carrier medium as recited in claim 96, wherein the program instructions are further computer-executable to implement:

15           said space service receiving a space service request message in said data representation language referencing said service advertisement for said service, wherein said space service request message specifies a first requested lease period for a first client;

20           said space service granting to said first client access to said service advertisement for a first granted lease period; and

          said space service sending a space service request response message in said data representation language advising said first client of said first granted lease period.

25   101. The carrier medium as recited in claim 100, wherein the program instructions are further computer-executable to implement:

30           said space service receiving, prior to said first granted lease period expiring, a lease renewal message in said data representation language referencing said service advertisement, wherein said lease renewal message specifies a





104. The carrier medium as recited in claim 103, wherein the program instructions are further computer-executable to implement:

5        said space service receiving a publish advertisement lease renewal message in said data representation language referencing said service advertisement provided by said service, wherein said publish advertisement lease renewal message specifies a second requested publishing lease period;

10                   said space service granting publishing of said service advertisement for a second  
                    granted publishing lease period; and

said space service removing said marking as stale of said service advertisement thus allowing access by clients to said service advertisement.

0965316-08-100